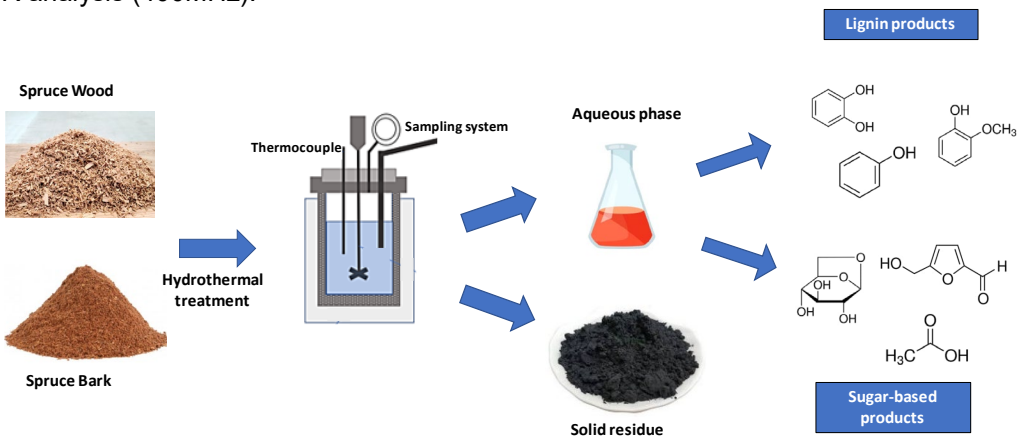
EFFECTS OF MASS TRANSFERS AND HEATING RATES DURING BARK AND WOOD HYDROTHERMAL TREATMENT

Saad NADER, Université de Lorraine, CNRS, ENSIC 54000 Nancy, France
saad.nader@univ-lorrraine.fr
Yann LE BRECH, Université de Lorraine, CNRS, ENSIC 54000 Nancy, France
Cédric PARIS, Université de Lorraine, ENSAIA 54000 Nancy, France
Eric MASSON, Crittbois, 88051 Epinal, France
Sébastien LECLERC, Université de Lorraine, CNRS 54000 Vandœuvre-lès-Nancy, France
Robert WOJCIESZAK, Université de Lille, CNRS 59655 Villeneuve d'Ascq cedex, France
Anthony DUFOUR, Université de Lorraine, CNRS, ENSIC 54000 Nancy, France

Key Words: wood, bark, hydrothermal, phenols, furans, NMR.

Hydrothermal treatment is considered as a potential interesting process to convert wet biomasses into rich carbon material (hydrochar) and/or liquids (for fuels or chemicals precursors). Advanced work [1–4] were conducted on the effect of mass transfers during liquid-phase conversion of biomass but most of them were related to low temperatures conversion (~200°C in hot compressed water [2,3]) or to lignin-first biomass fractionation (in methanol) [4]. To the best of our knowledge, the effect of heating rates on biomass hydrothermal conversion has been yet poorly investigated.
In this work, we study the effect of biomass particles size (for wood and bark, presenting different pores structure) and of stirring-rate on the formation kinetics of liquid products. Furthermore, the effect of heating rate is studied by an original induction heating system. The liquid products are analyzed by various complementary methods: LC-MS, GC-MS (after L/L extraction), Total Organic Carbon (TOC), ^{1}H NMR (etc.). Carbon balances are provided.
We introduce the interest of a bench-top NMR (60MHz) and of a solvent saturation method in order to rapidly assess the composition of the aqueous phase without any pretreatment. Bench-top NMR is compared to common NMR analysis (400MHz).



Simplified scheme of spruce bark and wood hydrothermal treatment

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